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7590 10/02/2008  
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EXAMINER
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ALEJANDRO MULERO, LUZ L

ART UNIT	PAPER NUMBER
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1792

MAIL DATE	DELIVERY MODE
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10/02/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/805,966	<b>Applicant(s)</b> SINGH ET AL.	
	<b>Examiner</b> Luz L. Alejandro	<b>Art Unit</b> 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 July 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-4, 6-9, 11-16, 18-21, 24, 25, 27, 28 and 30-39 is/are pending in the application.
- 4a) Of the above claim(s) 6 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 7-9, 11-16, 18-21, 24-25, 27-28, 30-39 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |                                                                                      |                                                                   |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____                                                          | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 07/18/08 has been entered.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 37-39 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The specification, as originally filed, fails to enable one of ordinary skill in the art how to make a parasitic antenna so that it is configured to provide parasitic damping.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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Claims 1-4, 7-9, 11-16, 18-21, 35-38, and 39 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1-line 11 and claim 38-line 8, recite the limitation “a platen for holding a target and biasing the target with a negative voltage” and “a platen configured to hold a target and to bias the target”, respectively. It should be noted that as recited in the claim applicant has failed to further limit the claimed apparatus since a structural limitation with respect to the apparatus further comprising a bias structure for biasing the target with a negative voltage has not been claimed. Furthermore, it is not clear how the platen will bias the target with a negative voltage. Correction and/or clarification is required.

In claims 37 and 39, it is unclear how the parasitic antenna is configured to provide parasitic damping. Clarification is required.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 38-39 are rejected under 35 U.S.C. 102(b) as being anticipated by Kadomura, U.S. Patent 5,567,268.

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Kadomura '268 shows the invention as claimed including a plasma apparatus comprising: a plasma chamber configured to receive a process gas; a radio frequency (RF) source configured to generate RF current; an RF antenna unit including a horizontally-extending active antenna coil 31 and a vertically extending parasitic antenna coil 22, the horizontally-extending active antenna coil that includes a first end coupled to the RF source 39 to receive the RF current from the RF source, the vertically-extending parasitic antenna coil being without an electrical connection to a power source; and a platen 29 configured to hold a target and bias the target, wherein the vertically-extending parasitic antenna induces an RF current into the plasma chamber and excites and ionizes a process gas so as to generate a plasma in the plasma chamber, the plasma comprising ions.

Concerning claim 39, Kadomura '268 also comprises: a plasma apparatus comprising: a plasma chamber (21,27) configured to contain a plasma generated in the plasma chamber, and an RF antenna unit including an active antenna (31 or 22) and a parasitic antenna (22 or 31), the active antenna that is proximate to the plasma chamber and that includes a first end coupled to the RF source to receive the RF current from the RF source and includes a second end coupled to ground, the parasitic antenna being proximate to the plasma chamber and being without an electrical connection with the RF source; wherein the parasitic antenna is configured to provide a parasitic damping to the plasma that is generated in the plasma chamber and that comprises ions (see figs. 2-3 and their descriptions).

Claims 38-39 are rejected under 35 U.S.C. 102(b) as being anticipated by Kadomura, U.S. Patent 6,096,160.

Kadomura '160 shows the invention as claimed including a plasma apparatus comprising: a plasma chamber configured to receive a process gas; a radio frequency (RF) source configured to generate RF current; an RF antenna unit including a horizontally-extending active antenna coil 52 and a vertically extending parasitic antenna coil 53, the horizontally-extending active antenna coil that includes a first end coupled to the RF source 66 to receive the RF current from the RF source, the vertically-extending parasitic antenna coil being without an electrical connection to a power source; and a platen 59 configured to hold a target and bias the target, wherein the vertically-extending parasitic antenna induces an RF current into the plasma chamber and excites and ionizes a process gas so as to generate a plasma in the plasma chamber, the plasma comprising ions.

Concerning claim 39, Kadomura '160 also comprises: a plasma apparatus comprising: a plasma chamber (51,57) configured to contain a plasma generated in the plasma chamber, and an RF antenna unit including an active antenna 52 and a parasitic antenna 53, the active antenna that is proximate to the plasma chamber and that includes a first end coupled to the RF source to receive the RF current from the RF source and includes a second end coupled to ground, the parasitic antenna being proximate to the plasma chamber and being without an electrical connection with the RF source; wherein the parasitic antenna is configured to provide a parasitic damping to

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the plasma that is generated in the plasma chamber and that comprises ions (see figs. 4-6 and their descriptions).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-3, 7-8, 11, 16, 35, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kadomura, U.S. Patent 5,567,268 in view of the Admitted Prior Art (APA) or Trow et al., US 5,824,607.

Kadomura shows the invention as claimed including a plasma apparatus comprising: a plasma chamber configured to receive a process gas; a radio frequency

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source 39 configured to generate RF current; an RF antenna unit including an active antenna (for example, 31) and a parasitic antenna (for example, 22), the active antenna surrounding the plasma chamber, including a first end electrically coupled to the RF source to receive the RF current from the RF source, and including a second end coupled to ground, the parasitic antenna surrounding the plasma chamber, wherein the parasitic antenna is capable of being not electrically coupled to the RF source; and a platen 29 for holding a target, wherein each antenna of the RF antenna unit resonates RF current and induces electromagnetic field that is effective to pass into the plasma chamber and that excites and ionizes the process gas to generate a plasma within the plasma chamber (see figs. 2-3 and their description).

Kadomura does not expressly disclose that the target is bias with a negative voltage. The APA discloses applying a negative voltage bias to the target in order to implant ions into the target. Furthermore, Trow et al. discloses biasing the target with a negative voltage in order to increase ion implantation in the target. Therefore, in view of these disclosures, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Kadomura as to bias the target with a negative voltage in order to attract and implant ions into the target.

Concerning claims 2-3, note that the active antenna includes a horizontally-extended coil and the parasitic antenna includes a vertically-extending coil.

Regarding claim 7, note that one of the active and parasitic antennas of the RF antenna unit is a horizontally extending coil having a plurality of windings and wherein a

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diameter of innermost winding of the horizontally extending coil in a lateral direction is greater than a size of the target in the lateral direction.

With respect to claim 8, note that the parasitic antenna can be considered to be above and coaxial with the active antenna.

Concerning claim 11, the plasma chamber includes: a horizontal planar section 24 positioned above the platen 29; a vertical cylindrical section extending from the horizontal planar section; and a top section 21 coupled to the vertically cylindrical section.

With respect to claim 16, Trow et al. further discloses where a top conductive section of the apparatus is cooled by liquid (see col. 4-lines 40-50). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Kadomura so as to cool by liquid because liquid is shown to be an adequate means of cooling a top conductive member of a plasma apparatus.

Concerning claim 35, the particular configuration of the coil is a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed coils is significant.

Regarding claim 37, note that the apparatus of Kadomura modified by the admitted prior art and Trow et al. includes a parasitic antenna configured to provide parasitic damping.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kadomura, U.S. Patent 5,567,268 in view of the Admitted Prior Art (APA) or Trow et al., US 5,824,607 as applied to claims 1-3, 7-8, 11, 16, 35, and 37 and further in view of Sahin et al., U.S. Patent 6,465,051.

Kadomura, APA, and Trow et al. are applied as above but do not expressly disclose where the parasitic antenna has one of its ends grounded. Sahin et al. discloses grounding an antenna 26 during processing, for example, in order to perform a cleaning process (see fig. 1 and its description). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Kadomura modified by APA or Trow so as to allow for grounding of either of the antennas to allow for more flexibility when using the apparatus, for example, to allow for efficient cleaning of the apparatus.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kadomura, U.S. Patent 5,567,268 in view of the Admitted Prior Art (APA) or Trow et al., US 5,824,607 as applied to claims 1-3, 7-8, 11, 16, 35, and 37 and further in view of Ishimaru, U.S. Patent 5,681,418.

Kadomura, APA, and Trow et al., are applied as above but do not expressly disclose wherein at least one antenna is liquid cooled. Ishimaru discloses forming a coil 40 which flows liquid water coolant therethrough (see col. 5-lines 13-21). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Kadomura modified by APA or Trow et

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al. so as to liquid cool the antenna because in such a way overheating of the antenna can be prevented.

Claims 12-13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kadomura, U.S. Patent 5,567,268 in view of the Admitted Prior Art (APA) or Trow et al., US 5,824,607 as applied to claims 1-3, 7-8, 11, 16, 35, and 37, and further in view of Collins et al., U.S. Patent 5,556,501.

Kadomura, APA, and Trow et al. are applied as above but do not expressly disclose wherein the vertical cylindrical section is made of a high quality dielectric, and the top conductive section is made of aluminum and grounded. Collins et al. discloses wherein a vertical cylindrical section 17W is made of a dielectric, and the top conductive section 17T is made of aluminum and grounded (see fig. 1 and its description). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Kadomura modified by APA or Trow et al. so as to comprise the vertically cylinder and top conductive section of Collins et al. because this will allow the improvement of process uniformity.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kadomura, U.S. Patent 5,567,268 in view of the Admitted Prior Art (APA) or Trow et al., US 5,824,607 and Collins et al., U.S. Patent 5,556,501, as applied to claims 12-13 and 15 above, and further in view of Fitzsimmons et al., U.S. Patent 6,626,188.

Kadomura, APA, Trow et al., and Collins et al. are applied as above but do not expressly disclose wherein the ceramic material is one from a list including aluminum nitride. Fitzsimmons et al. discloses having aluminum nitride walls exposed to the plasma within the chamber (see fig. 3 and its description). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Kadomura modified by APA, or Trow et al., and Collins et al. so as to form aluminum nitride in the plasma chamber because in such a way beneficial results will be produced such as the reduction of contamination.

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kadomura, U.S. Patent 5,567,268 in view of the Admitted Prior Art (APA) or Trow et al., US 5,824,607 as applied to claims 1-3, 7-8, 11, 16, 35, and 37, and further in view of Kumagai, U.S. Patent 5,916,455.

Kadomura, APA, and Trow et al. are applied as above but do not expressly disclose a plasma igniter for introducing a strike gas into the plasma chamber to assist in igniting a plasma. Kumagai discloses a plasma igniter 30 for introducing a strike gas into the plasma chamber to assist in igniting a plasma (see fig. 1-2 and their descriptions). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Kadomura modified by APA or Trow et al., so as to comprise a plasma igniter because in such a way plasma will be more easily ignited for processing within the apparatus.

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kadomura, U.S. Patent 5,567,268 in view of the Admitted Prior Art (APA) or Trow et al., US 5,824,607 as applied to claims 1-3, 7-8, 11, 16, 35, and 37, and further in view of Collins, U.S. Patent 5,707,486.

Kadomura, APA, and Trow et al. are applied as above but do not expressly disclose a gas source controller for maintaining a pressure of a plasma chamber at a predetermined value. Collins discloses a controller for controlling the pressure of a plasma chamber (see col. 13-lines 6-20). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Kadomura modified by APA or Trow et al., so as to include the controller of Collins to control the pressure of the plasma chamber because such a device would allow for greater controllability over the process performed within the apparatus.

Claims 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kadomura, U.S. Patent 5,567,268 in view of the Admitted Prior Art (APA) or Trow et al., US 5,824,607 as applied to claims 1-3, 7-8, 11, 16, 35, and 37, and further in view of Collins et al., U.S. Patent 5,556,501.

Kadomura, APA, and Trow et al. are applied as above but do not expressly disclose the RF source operating at a low frequency. Collins et al. discloses a RF source 31 which has a frequency in a range from 100 kHz to 100 Mhz (see col. 11-lines 25-40). In view of this disclosure, it would have been obvious to one of ordinary skill in

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the art at the time the invention was made to modify the apparatus of Kadomura modified by APA, or Trow et al., so as to provide the RF source of Collins et al. because this will allow for the selection of a top source which minimizes damage to sensitive devices and also provides efficient inductive coupling.

Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kadomura, U.S. Patent 5,567,268 in view of the Admitted Prior Art (APA) or Trow et al., US 5,824,607 as applied to claims 1-3, 7-8, 11, 16, 35, and 37 above, and further in view of Okumura et al., US 5,888,413, Chen et al., US 6,527,912 or Becker et al., US 6,899,817.

Kadomura, APA and Trow et al. do not expressly disclose the claimed coil adjuster for adjusting a number of turns of the parasitic antenna. Okumura et al. discloses a coil adjuster 72/64,66/82,83/93 for adjusting the length and the number of turns of a coil (see figs. 13, 20-23 and their descriptions). Chen et al. discloses a coil adjuster 117 for adjusting the length and the number of turns of a coil (see figs. 2, 6 and 8, and their descriptions). Becker et al. discloses a coil adjuster 24/25 for adjusting the length and the number of turns of a coil (see fig. 2 and its description). In view of these disclosures, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Kadomura modified by APA and Trow et al., so as to allow the coils to have their lengths and turns adjusted as suggested by Okumura et al., Chen et al. or Becker et al. because in such a way the plasma density can be effectively controlled and adjusted.

Claims 24-25, 27, 31, and 33-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kadomura, U.S. Patent 5,567,268 in view of the Admitted Prior Art (APA) or Trow et al., US 5,824,607, Collins et al., U.S. Patent 5,556,501, and Denholm et al., U.S. Patent 5,911,832 or Tozuka, U.S. Patent 4,771,730.

Kadomura shows the invention substantially as claimed including a plasma chamber comprising: a horizontal planar section for positioning above a platen; a vertical cylindrical dielectric section 21 extending from the horizontal planar section; and a radio frequency antenna including a horizontally-extending coil 22 positioned proximate to the horizontal planar dielectric section and a vertically-extending coil 31 positioned proximate to the vertical cylindrical dielectric section, the radio frequency antenna including radio frequency currents into the plasma chamber that excite and ionize a process gas so as to generate a plasma in the plasma chamber (see fig. 2 and its description).

Kadomura does not expressly disclose that the target is bias with a negative voltage. The APA discloses applying a negative voltage bias to the target in order to implant ions into the target. Furthermore, Trow et al. discloses biasing the target with a negative voltage in order to increase ion implantation in the target. Therefore, in view of these disclosures, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Kadomura as to bias the target with a negative voltage in order to attract and implant ions into the target.

With respect to the limitation of a liquid cooled top conductive section coupled to the vertical section, Trow et al. further discloses where a top conductive section of the apparatus is cooled by liquid (see col. 4-lines 40-50). Additionally, Collins et al. discloses a plasma chamber comprising a cooled top conductive section 17T coupled to a vertical dielectric section 17W (see fig. 1 and its description). In view of these disclosures, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Kadomura so as to include a liquid cooled top conductive section coupled to the vertical dielectric section as disclosed by Collins et al. or Trow et al., because in such a way the coupling of the plasma with the wafer will be improved while at the same time having improved controllability of the temperature of the chamber walls, and because liquid is shown to be an adequate means of cooling a top conductive member of a plasma apparatus.

Kadomura, APA, Trow et al., and Collins et al. are applied as above but do not expressly disclose the horizontal planar section being a dielectric. Denholm et al. discloses covering an electrode with a dielectric material (see col. 3-lines 1-12). Alternatively, Tozuka also discloses covering an electrode with a dielectric material (see col. 2-lines 19-34). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Kadomura modified by APA, Trow et al., and Collins et al. so as to include a dielectric in the horizontal planar section because in such a way damage from any potential residues can be minimized.

Concerning claim 25, note that in the apparatus of Kadomura modified by APA, Trow et al., Collins et al., Denholm et al., and Tozuka, the top conductive section is grounded (see Collins et al. at col. 21-lines 60-67).

With respect to claim 31, note that in the apparatus of Kadomura modified by APA, Trow et al., Collins et al., Denholm et al., and Tozuka, the horizontally extended coil is capable of being coupled to an RF source.

Regarding claims 33-34, note that the apparatus of Kadomura modified by APA, Trow et al., Collins et al., Denholm et al., and Tozuka discloses: wherein the horizontally-extending coil is spaced apart from the target by a first height in a vertical direction and the vertically-extending coil is spaced apart from the target by a second height in the vertical direction, the first height being less than the second height.

Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kadomura, U.S. Patent 5,567,268 in view of in view of the Admitted Prior Art (APA) or Trow et al., US 5,824,607 Collins et al., U.S. Patent 5,556,501, Denholm et al., U.S. Patent 5,911,832 or Tozuka, U.S. Patent 4,771,730 as applied to claims 24-25, 27, 31, and 33-34 above, and further in view of Sahin et al., U.S. Patent 6,465,051.

Kadomura, APA, Trow et al., Collins et al., Denholm et al., and Tazuka are applied as above but does not expressly disclose where the parasitic antenna has one of its ends grounded. Sahin et al. discloses grounding an antenna 26 during processing, for example, in order to perform a cleaning process (see fig. 1 and its description). In view of this disclosure, it would have been obvious to one of ordinary

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skill in the art at the time the invention was made to modify the apparatus of Kadomura modified by APA or Trow et al., Collins et al., and Denholm et al., or Tozuka so as to allow for grounding of either of the antennas to allow for more flexibility when using the apparatus, for example, to allow for efficient cleaning of the apparatus.

Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kadomura, U.S. Patent 5,567,268 in view of in view of the Admitted Prior Art (APA) or Trow et al., US 5,824,607 and Collins et al., U.S. Patent 5,556,501, Denholm et al., U.S. Patent 5,911,832 or Tozuka, U.S. Patent 4,771,730 as applied to claims 24-25, 27, 31, and 33-34 above, and further in view of Ishimaru, U.S. Patent 5,681,418.

Kadomura, APA, Trow et al., Collins et al., Denholm et al., and Tozuka are applied as above but do not expressly disclose wherein at least one antenna is liquid cooled. Ishimaru discloses forming a coil 40 which flows liquid water coolant therethrough (see col. 5-lines 13-21). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Kadomura modified by APA or Trow et al., Collins et al. and Denholm et al., or Tozuka so as to liquid cool the antenna because in such a way overheating of the antenna can be prevented.

Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kadomura, U.S. Patent 5,567,268 in view of the Admitted Prior Art (APA) or Trow et al., US 5,824,607 and Collins et al., U.S. Patent 5,556,501, Denholm et al., U.S. Patent

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5,911,832 or Tozuka, U.S. Patent 4,771,730 as applied to claims 24-25, 27, 31, and 33-34 above, and further in view of Kumagai, U.S. Patent 5,916,455.

Kadomura, APA, Trow et al., Collins et al., Denholm et al., and Tozuka are applied as above but do not expressly disclose a strike gas inlet. Kumagai discloses a strike gas inlet (see ignition chamber 30) whereby plasma is ignited and expelled into the inductively coupled plasma chamber (see fig. 1-2 and their descriptions). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Kadomura modified by APA or Trow et al., Collins et al., and Denholm et al., or Tozuka so as to comprise a strike gas inlet because in such a way plasma will be more easily ignited for processing within the apparatus.

### ***Response to Arguments***

Applicant's arguments filed 07/18/08 have been fully considered but they are not persuasive. However, applicant's argument with respect to the rejection of Kadomura '160 under 35 USC 103 is persuasive and this rejection is withdrawn.

Regarding the rejections of claims 1-4, 7-9, 11-16, 18-21, 35-37, and 38 under 35 USC 112, second paragraph, applicant argues that in claim 1 with respect to the platen is broad and therefore should not be rejected. However, the examiner respectfully submits that claim 1 has not been rejected under 35 USC 112, second paragraph because the limitation of the platen is broad but rather because the limitation is not an apparatus limitation and the claim is drawn to the apparatus.

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Furthermore, applicant argues that the antenna mentioned in Kadomura '268, as being the parasitic antenna will not be the parasitic antenna because it does not perform the same function as the parasitic antenna of the instant invention. However, the examiner believes that the parasitic antenna of Kadomura will perform the same function as in the instant application, and no secondary evidence has been provided by the applicant to show otherwise. Either of the antennas in Kadomura can be considered parasitic because they have switches that enable the antenna to be not connected to the RF power supply (making this antenna parasitic), while the other antenna can be connected to the RF power supply and be an active antenna (see figs. 2-3), thereby allowing the plasma chamber to be tuned by parasitic damping via the parasitic antenna and disclosing the claimed invention.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Concerning the rejection of claim 24, applicant's arguments are moot in view of the new grounds of rejection.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luz L. Alejandro whose telephone number is 571-272-

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1430. The examiner can normally be reached on Monday to Thursday from 7:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Luz L. Alejandro  
Primary Examiner  
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